

**TECHNICAL REVIEW DOCUMENT**  
**For**  
**RENEWAL OF OPERATING PERMIT 96OPMR153**

Brush Cogeneration Partners– Brush 2  
Morgan County  
Source ID 0870027

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May 2004

Revised July and August 2004

Revised November 26, 2004 to revise Colorado Regulation No. 3 citations, as  
necessary, based on recent revisions to the regulation

**I. Purpose**

This document will establish the basis for decisions made regarding the applicable requirements, emission factors, monitoring plan and compliance status of emission units covered by the renewed operating permit proposed for this site. The original Operating Permit was issued February 1, 2000 and expires on February 1, 2005. This document is designed for reference during the review of the proposed permit by the EPA, the public, and other interested parties. The conclusions made in this report are based on information provided in the renewal application submitted January 30, 2004, additional technical information submitted March 24 and May 10, 2004, comments on the draft renewal permit and technical review document received on August 27, 2004, previous inspection reports and various e-mail correspondence, as well as telephone conversations with the applicant. Please note that copies of the Technical Review Document for the original permit and any Technical Review Documents associated with subsequent modifications of the original Operating Permit may be found in the Division files as well as on the Division website at <http://www.cdphe.state.co.us/ap/Titlev.html>.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised construction permit.

**II. Description of Source**

This facility consists of a cogeneration facility defined under Standard Industrial Classification 4911. Electricity for sale is produced by a combustion turbine equipped with a diesel starter engine and duct burner. This combustion turbine/duct burner is part of the Brush Cogeneration Facility. A separate Operating Permit has been issued for

each operating company, however, for permitting purposes the Brush Cogeneration Facility is considered one stationary source. The combustion turbine serves a generator rated at 32 MW and is equipped with a dry low NO<sub>x</sub> combustion system to reduce NO<sub>x</sub> emissions. Exhaust gas from the combustion turbine, which may be heated further by the duct burner, is routed to a waste heat boiler to generate high pressure steam to drive a condensing steam turbine and hot water to heat a greenhouse complex. The steam turbine generates 39 MW of electricity. The duct burner is equipped with low NO<sub>x</sub> burners to reduce NO<sub>x</sub> emissions. There are also three natural gas fired boilers to provide heat to the greenhouse complex when waste heat from the turbine/duct burner is not available or inadequate to meet the demand. In addition, there is a cooling tower at the facility, which has emissions above APEN de minimis levels, and is therefore considered a significant emission unit. The turbine at this facility is referred to as Brush 2 or GT-3.

Based on the information available to the Division and provided by the applicant, it appears that no modifications to the significant emission units has occurred since the original issuance of the operating permit.

The facility is located on 90 acres just south of Brush. The area in which the plant operates is designated as attainment for all criteria pollutants.

There are no affected states within 50 miles of the plant and there are no Federal Class I designated areas within 100 kilometers of the plant.

The summary of emissions that was presented in the Technical Review Document (TRD) for the original permit issuance has been modified to more appropriately identify the potential to emit (PTE) since modifications have been made to the Brush Cogeneration Partnership (BCP) emission units, as well as the other emission units at the Brush Cogeneration Facility. Emissions (in tons/yr) at the facility are as follows:

Emission Unit	PM	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	HAPS
BCP – Turbine*	5.1	5.1	1.2	105.7	44	32	See Table on Page 10
BCP – Duct Burner							
BCP - Engine							
BCP – Boilers				5	4.2		
BCP – Cooling Tower	4.4	4.4					
<b>BCP Total Emissions</b>	9.1	9.1	1.2	110.7	48.2	32	4.09
CPP – Turbines*	5	5	3.4	134	147.5	24.2	See Table on Page 10
CPP – Duct Burners							

Emission Unit	PM	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	HAPS
CPP – Engines							See Table on Page 10
CPP – Boilers				11.5	9.7		
CPP – Cooling Tower	2.5	2.5					
BIV – Turbines**	9.71	9.71	2.79	60	120	22.38	
BIV – Duct Burners							
BIV – Cooling Towers	6.87	6.87					
<b>Facility Total Emissions</b>	33.58	33.58	7.39	316.2	325.4	78.58	18.55

\*permitted emissions for the turbine(s), duct burner(s) and starter engine(s) is a combined limit.

\*\*permitted emissions for the turbines and duct burners is a combined limit.

Potential to Emit is based on permitted emission limits. The Division's emission inventory indicates that BCP typically reports and pays fees on potential emissions, which is an acceptable practice, and therefore no actual emission data is available.

The breakdown of HAP emissions by emission unit and individual HAP is provided on page 10 of this document. Since the HAP emissions, on an hourly basis, are higher for the turbines than the duct burners, the HAP PTE is based on the turbines burning all the fuel (fuel consumption limits typically apply to the turbine(s) and duct burner(s) combined). For the BCP turbine, the turbine can run 8760 hrs/yr and there is leftover fuel for the duct burner to operate; therefore, HAP emissions for both the turbine and duct burner were calculated. HAP emissions for all equipment, except the turbines, are based on AP-42 emission factors. For the turbines, HAP emissions are based on the higher emission factor from either AP-42 or EPA's August 22, 2003 memo on HAP emission factors for turbines.

### MACT Requirements

#### Case-by-Case MACT - 112(j) (40 CFR Part 63 Subpart B §§ 63.50 thru 63.56)

Under the federal Clean Air Act (the Act), EPA is charged with promulgating maximum achievable control technology (MACT) standards for major sources of hazardous air pollutants (HAPs) in various source categories by certain dates. Section 112(j) of the Act requires that permitting authorities develop a case-by-case MACT for any major sources of HAPs in source categories for which EPA failed to promulgate a MACT standard by May 15, 2002. These provisions are commonly referred to as the "MACT hammer".

Owner or operators that could reasonably determine that they are a major source of HAPs which includes one or more stationary sources included in the source category or subcategory for which the EPA failed to promulgate a MACT standard by the section

112(j) deadline were required to submit a Part 1 application to revise the operating permit by May 15, 2002. The source submitted a notification but the cover letter for the notification indicated that they did not believe that HAP emissions from the facility were above the major source level (10 tons per year of any single HAP or greater than 25 tons per year of all HAPs combined), but requested that the Division indicate whether the source is major for HAPS. Based on the Division's analysis, the Brush Cogeneration Facility is a major source of HAPS for a covered source category (combustion turbine, reciprocating internal combustion engines (RICE) and industrial, commercial and institutional boilers and process heaters). Since the EPA has signed off on final rules for all of the source categories which were not promulgated by the deadline, the case-by-case MACT provisions in 112(j) no longer apply.

#### Combustion Turbine MACT (40 CFR Part 63 Subpart YYYY)

In accordance with 40 CFR Part 63 Subpart YYYY §63.6090(b)(4), existing (construction commenced prior to January 14, 2003) stationary combustion turbines do not have to meet the requirements of Subparts A and YYYY, including the initial notification requirements.

#### RICE MACT (40 CFR Part 63 Subpart ZZZZ)

The RICE MACT (40 CFR Part 63 Subpart ZZZZ) was signed as final on February 26, 2004 and was published in the Federal Register on June 15, 2004. An affected source under the RICE MACT is any existing, new or reconstructed stationary RICE with a site-rating of more than 500 hp. In accordance with 40 CFR Part 63 Subpart ZZZZ § 63.6590(b)(3), existing (commenced construction or reconstruction prior to December 19, 2002) compression ignition engines do not have to meet the requirements of Subparts A and ZZZZ, including the initial notification requirements.

#### Industrial, Commercial and Institutional Boilers and Process Heaters MACT (40 CFR Part 63 Subpart DDDDD)

The final rule for industrial, commercial and institutional boilers and process heaters was signed on February 26, 2004 but has not yet been published in the Federal Register. Based on the final rule (40 CFR Part 63 Subpart DDDDD § 63.7506(b)(1)), existing large gaseous fuel units are exempt from Subparts A and DDDDD, except for the initial notification requirements. Note that the initial notification requirements have not been included in the renewal permit, since the final rule has not been published in the Federal Register. In the event that the rule is published prior to issuance of the renewal permit, the Division will include the appropriate requirements in the permit.

#### CAM Requirements

CAM applies to any emission unit that is subject to an emission limitation, uses a control device to achieve compliance with that emission limitation and has potential pre-control emissions greater than major source levels. As discussed in the technical review

document for the August 8, 2003 modification, although the turbine is equipped with a dry low NO<sub>x</sub> (DLN) combustion system, DLN is not considered a control device. In addition, as indicated in the original construction permit application (submitted 12/91), the duct burner is equipped with low NO<sub>x</sub> burners to reduce NO<sub>x</sub> emissions. Low NO<sub>x</sub> burners are not considered control devices as defined in 40 CFR Part 64 § 64.1, as adopted by reference in Colorado Regulation No. 3, Part C, Section XIV, since low NO<sub>x</sub> burners are considered inherent process equipment. Finally, although the cooling tower is equipped with drift eliminators, drift eliminators are not considered a control devices as defined in 40 CFR Part 64 § 64.1, as adopted by reference in Colorado Regulation No. 3, Part C, Section XIV, since the drift eliminators act as a passive control measure prevent release of pollutants (i.e. drift). Therefore, no emission units are equipped with control devices and CAM does not apply.

### **III. Discussion of Modifications Made**

#### **Source Requested Modifications**

The source's requested modifications identified in the renewal application were addressed as follows:

##### **Section II, Condition 1.4.2**

The source submitted a combination renewal and minor permit modification on January 30, 2004. The application did not address any specific changes to the renewal application. The requested minor modification was to include alternative BACT limits for NO<sub>x</sub> during periods of startup and shutdown. In the administrative completeness letter for the renewal application (dated February 17, 2004) the Division informed the source that the requested change could not be processed as a minor modification, since the addition of alternative BACT limits would be considered a change to a case-by-case determination which must be processed as a significant modification as required by Colorado Regulation No. 3, Part A, Section I.B.36.h.(iii), therefore the requested modification will be processed along with the renewal permit application.

The source requested alternative NO<sub>x</sub> BACT limits for startup and shutdown of 50 ppmvd @ 15% O<sub>2</sub> and at ISO conditions. The modification request indicated that the definition of startup was the period beginning with insertion of fuel to when the gross power output (turbine and duct burner) is equal to or greater than 40 MW and that the definition of shutdown is when the order to shutdown is received until the gross power output (turbine and duct burner) is less than or equal to 40 MW and ends when emissions cease. The source submitted continuous emission monitoring data from four separate startup and shutdown events on March 24, 2004. In addition, the source submitted via e-mail, a justification of the 40 MW gross power output (this is the minimum dispatch load) used in the startup and shutdown definition. The Division will include the NO<sub>x</sub> BACT limits as requested. Note that the definition of shutdown was revised slightly in the renewal permit.

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Although not specifically requested in the renewal permit application, the Division revised the title for the permit contact and under “issued to” revised the owner’s name to “Brush Cogeneration Partnership”, rather than “Brush Cogeneration Partners” as indicated on the form 2000-100 submitted with the renewal application.

#### General

Although not specifically requested in the renewal permit application the Division revised the headers and footers and the tables in Appendices B and C to indicate the owner’s name as “Brush Cogeneration Partnership” rather than “Brush Cogeneration Partners.” This change was made based on the information indicated on the form 2000-100 submitted with the renewal application.

#### Section I, Condition 1.1

Although not specifically requested in the renewal permit application, the Division revised the source description to more accurately reflect equipment at the site. The revised description is based on the information on the form 2000-102 submitted with the renewal application.

#### Appendix A – Insignificant Activity List

Although not specifically requested in the renewal permit application, the Division revised the insignificant activity list based on the updated list included on form 2000-700 of the renewal application.

#### **Other Modifications**

In addition to the source requested modifications, the Division has included changes to make the permit more consistent with recently issued permits, include comments made by EPA on other Operating Permits, as well as correct errors or omissions identified during inspections and/or discrepancies identified during review of this renewal.

The Division has made the following revisions, based on recent internal permit processing decisions and EPA comments to the Brush 2 Renewal Operating Permit. These changes are as follows:

#### Page Following Cover Page

Monitoring and compliance periods and report and certification due dates are shown as examples. The appropriate monitoring and compliance periods and report and certification due dates will be filled in after permit issuance and will be based on permit issuance date. Note that the source may request to keep the same monitoring and compliance periods and report and certification due dates as were provided in the original permit. However, it should be noted that with this option, depending on the permit issuance date, the first monitoring period and compliance period may be short (i.e. less than 6 months and less than 1 year).

## General

- The Reg 3 citations were revised throughout the permit, as necessary, based on the recent revisions made to Reg 3.

## Section I – General Activities and Summary

- In Condition 1.4, General Condition 3.g (Common Provisions, Affirmative Defense) was added as a State-only requirement.

## Section II.1 – Combustion Turbine, Duct Burner and Starter Engine

### BACT Limits - Averaging Time

Although not specifically addressed in the construction permit (91MR934-1), the BACT emission limits were based on a one-hour average and in their original Title V permit application, the source indicated that they were out of compliance with the BACT limits. During processing of the original Title V operating permit, the source had submitted several requests for alternative BACT emission limits for periods of low ambient temperature. The Division reviewed these requests but did not believe that the alternative limits for such conditions were warranted. However, in the issued Title V operating permit, the Division revised the averaging time from hourly to daily. Upon further review, the Division considers that changing the averaging time was not appropriate as it was a relaxation in the BACT limits. In addition, the Division considers that the BACT limit should be based on an averaging time that is consistent with the national ambient air quality standards (NAAQS), since compliance with the NAAQS must be demonstrated before the permit can be issued. The NAAQS for CO are a 1-hr and an 8-hour standard; therefore, a daily average is not appropriate for CO. Although the NAAQS for NO<sub>x</sub> is an annual average, NO<sub>x</sub> emissions are used in the visibility analysis which is based on a daily emission rate; therefore, a daily average would have been acceptable for NO<sub>x</sub>, had the original construction permit set the NO<sub>x</sub> averaging time as a daily average. Therefore, the averaging time has been changed to reflect the one-hour averaging time initially specified in the construction permit.

The Division understands that the source may still have issues with cold weather operation. However, the Division will not include an alternative BACT limit for CO during cold/wet weather at this time. We would expect that such weather patterns would be infrequent and enforcement discretion could be used for small percentages of excess emissions due to these weather patterns. If in the future, the source has sufficient data to indicate that exceedances of the CO emission limit during certain weather patterns are not infrequent, the Division would reconsider providing an alternative BACT limit for cold/wet weather. Please note, that although the source had previously submitted data during the processing of the original Title permit application showing non-compliance with the CO emission limit during cold/wet weather, the data did not justify the requested ambient temperature threshold or the requested alternative BACT limit.

## BACT Limits - Correction to ISO Conditions

In processing the original Title V permit application, the source had requested in their comments on the draft permit (received June 30, 1998) that the Division change the NO<sub>x</sub> and CO BACT emission limits to 15% O<sub>2</sub>, rather than 15% O<sub>2</sub> at ISO conditions. The source indicated that the 15% O<sub>2</sub> was consistent with the BACT emission limits for the Colorado Power Partnership (CPP) construction permit (91MR933). In the technical review document for the original Title V permit, the Division indicated that we would not make the change since the ISO conditions were part of the BACT limitation. The original construction permit issued to CPP included the BACT limits at 15% O<sub>2</sub> and ISO conditions. In the second modification to the CPP permit, the Division revised the BACT limits due to changes made to the turbines based on compliance issues and dropped the ISO conditions. The original construction permit application submitted for the Brush 2 unit proposed numerical BACT limits at 15% O<sub>2</sub> and it is not clear in that application if the source intended those limits to be corrected to ISO conditions. When the Division issued the initial approval permit, the BACT limits were at 15% O<sub>2</sub> and ISO conditions. It is possible that the Division included the ISO conditions as that is consistent with the NSPS GG NO<sub>x</sub> limit. However, the Brush 2 permit appears to be the only turbine PSD permit that set the BACT limits at 15% O<sub>2</sub> and ISO conditions.

After further review, the Division has determined that although the ISO conditions may be part of the BACT limits, the addition of the requirement to correct the NO<sub>x</sub> and CO limits to ISO conditions may not have been appropriate, since it is not clear whether the source's proposed BACT limits were actually based on ISO conditions. In addition, revising the BACT limits to 15% O<sub>2</sub> is consistent with other turbine PSD permits issued by the Division. Finally, since typically the ISO correction results in a higher ppm level than the 15% O<sub>2</sub> level, removing the requirement to correct to ISO conditions may alleviate some of the concerns with the CO emissions as discussed above.

## Turbine Operating Mode (simple vs. combined cycle mode)

When the Division revised the original Title V permit on August 8, 2003, we made significant changes to the format to be more consistent with other operating permits for similar facilities. In addition, the permit was revised to address the turbine operating mode, i.e. simple (turbine only) versus combined cycle (turbine plus HRSG) operation. The Division had incorrectly assumed that the unit was capable of operating in both modes. In addition, it is not clear that the modeling analyses conducted for the facility addressed simple cycle operation or that such an analysis would have been necessary. In addition, operation of the unit in simple cycle mode may make this unit an affected unit subject to the Acid Rain requirements. Therefore, since the unit cannot be operated in both simple and combined cycle modes, the Division will revise the permit to make it clear that this unit is only permitted to run in combined cycle mode. If the source wishes to have the flexibility to operate the unit in both simple and combined cycle modes, they would need to address the modeling and the Acid Rain Program applicability issues.



## Fuel Sampling For NSPS Subpart GG

In the technical review document for the August 8, 2003 revised permit (page 12), the Division indicated that we revised the language regarding fuel sampling for the NSPS GG SO<sub>2</sub> requirements. NSPS GG requires daily sampling of fuel to monitor compliance with the GG SO<sub>2</sub> requirements. The Division revised the permit to specify that if the natural gas used as fuel met the definition of pipeline quality gas in 40 CFR Part 72, that compliance with the NSPS GG SO<sub>2</sub> requirements were presumed. The Division indicated in the technical review document that this alternative to the NSPS GG fuel sampling requirements had been approved by EPA for other similar sources. In addition, the Division indicated in the technical review document for the source had submitted a similar request to EPA for approval (letter to EPA dated 8/26/02) but that we were not aware that they had received a response from EPA. Since that technical review document was written, EPA has approved the source's request (see attached letter dated May 7, 2004).

It should be noted that NSPS GG was revised on July 8, 2004 (Federal Register, Volume 69, No. 130). The NSPS GG revisions provide additional monitoring options for NO<sub>x</sub> emissions and nitrogen and sulfur content monitoring that have previously been approved by EPA. The revisions specify that previously approved alternative monitoring methods for existing turbines could still be used. Since the Brush 2 turbine has previously approved monitoring, no revisions have been made to the renewal permit based on the NSPS GG revisions.

## Issue in Original Title V Permit Processing

As previously indicated, when the original Title V permit application was submitted on February 23, 1996, the source indicated that they were out of compliance with the NO<sub>x</sub> and CO BACT limitations. In addition, the source had also indicated that they were out of compliance with the fuel consumption limit for the turbine. In their compliance plan submitted on March 29, 1996, the source indicated that they would revise the construction permit for the turbine to increase the fuel consumption limit. In addition, in comments on the draft operating permit (received June 30, 1998), the source requested again that the fuel consumption limits for the turbine be increased from 1,600 mmSCF/yr to 2000 mmSCF/yr. The Division included the increase in fuel consumption in the final permit issued on February 1, 2000. In processing the increase in the fuel consumption limit, the Division did not determine whether the increase in the fuel consumption limits would result in a net significant emissions increase (i.e. the actual to potential test was not conducted). The Division that although we failed to determine whether the increase in fuel consumption was a major modification, we believe that if a BACT analysis were conducted, no add-on controls would have been required. In addition, since the source was not requesting an increase in the annual emission limits, no additional modeling would have been required.

## Section IV – General Conditions

- General Condition No. 3 was revised to reflect that 3.g (affirmative defense) is state-only until approved by EPA.

**Total HAP Emissions (tons/yr) from Brush Cogeneration Facility**

Emission Unit	formaldehyde	acetaldehyde	toluene	benzene	acrolein	xylene	chloroform	hexane	dichlorobenzene	nickel	cadmium	chromium	propylene	Total
BCP - Turbine	2.19	0.20	0.56	0.02	0.01	0.10		0.52	3.44E-04	6.03E-04	3.16E-04	4.02E-04		3.59
BCP - DB	0.02		9.76E-04	6.03E-04										0.02
BCP - engine	3.23E-04	2.10E-04	1.12E-04	2.56E-04	2.53E-05	7.81E-05							7.07E-04	1.71E-03
BCP - Boilers	3.75E-03		1.70E-04	1.05E-04				0.09	6.00E-05	1.05E-04	5.50E-05	7.00E-05		0.09
BCP - Cool Twr							0.38							0.38
CPP - Turbines	6.73	0.14	0.42	0.49	0.02	0.07								7.87
CPP - Boilers	0.01		3.91E-04	2.42E-04				0.21	1.38E-04	2.42E-04	1.27E-04	1.61E-04		0.22
CPP-Engines	3.23E-04	2.10E-04	1.12E-04	2.56E-04	2.53E-05	7.81E-05							7.07E-04	1.71E-03
CPP - Cool Twr							0.16							0.16
BIV - Turbines	4.95	0.10	0.31	0.36	0.02	0.05								5.78
BIV - Cool Twr							0.43							0.43
Total	13.90	0.43	1.28	0.86	0.05	0.23	0.97	0.81	5.42E-04	9.49E-04	4.97E-04	6.33E-04	1.41E-03	18.55

The heating value of natural gas was presumed to be 1020 Btu/scf and the heating value of diesel was presumed to be 137,000 Btu/gal

Since the turbines have the highest HAP emissions, for CPP and BIV, HAP emissions are based on the turbine only. For BCP, because of the higher fuel limit, the turbine runs 8760 hrs/yr and the duct burner for the remainder.

HAP emissions from the BIV turbines are based on the annual hours of operation multiplied by the design heat rate.